Amendments to the Specification:

Please delete the paragraph beginning on page 2, line 15, and replace it with the following replacement paragraph:

Groen et al. suggest eight criteria for comparing the performance of autofocus functions. These are: 1) unimodality, or the existence of a single maximum or minimum; 2) accuracy, or coincidence f the extremum and best focus; 3) reproducibility, or a sharp extremum; 4) range, or the vertical distance over which the function will unambiguously determine the direction to best focus; 5) general applicability, or the ability to work on different classes of images; 6) insensitivity to other parameters, or independence from influences such as changes in mean intensity; 7) video signal compatibility, or the ability to use the same video signal as is utilized for image analysis; and 8) implementation, that is, it should be possible to calculate the function rapidly. Groen et al. concluded that three autofocus functions, i.e., two gradient functions and the intensity variance, performed the best. However, some autofocus functions that performed well on one specimen did not perform well on others and the authors cautioned against extrapolating the results to other imaging modes and specimens. Under insensitivity to other parameters is considered robustness against noise and optical artifacts common to microscopic image acquisition. Further, it is preferable to avoid that unimodality of the focus curve is an absolute necessary requirement because unimodality cannot be achieved in ~~regularly~~ regular practice. As a consequence, the range of broadness of the extremum in the focus curve is of less relevance.

Please delete the paragraph beginning on page 5, line 22, and replace it with the following replacement paragraph:

In the above method, apparatus, and mechanism, the spatial extent of the smoothing function may be manually or electronically settable or a combination of both. For instance, the spatial extent may be manually settable. The operator may enter a dimension of an object in the image to be captured which is to be used for autofocusing purposes. Alternatively, a default value may be selected by the apparatus and a focusing attempt made. If no suitable focus score is achieved, an alternative spatial extent for the smoothing function may be automatically selected by the apparatus. Alternatively, the operator may input a range, e.g. 1

to 5 microns and the apparatus selects the spatial extent of the smoothing function based on a value derived from the range, e.g. the mid-value or the lowest value derived from the range. This value may be used for a first attempt at autofocusing. If this first attempt is not successful, the apparatus may select another value within the range specified by the operator. The large the spatial extent of the smoothing function the less the noise in the image but also the greater is the chance that small objects in the image are not "seen" by the filter and therefore are not used for autofocusing. Where these small objects are dust particles, the failure of the filter to see these particles is an advantage. Hence, a larger value of the spatial extent can eliminate erroneous results caused by "noise", e.g. dust particles. The spatial extent should not be chosen too large otherwise the objects which are to viewed in the image may be smaller that the spatial extent of the smoothing function with the result that the details of the sought object no longer drive the convergence of the filter on the correct focus position. The ability to manually or electronically select the spatial extent of the smoothing function has the advantage that the optimum smoothing extent can be chosen which reduces noise to a minimum while still allowing the autofocusing system to select the focus position based on the object to be captured in the image.

Please delete the paragraph beginning on page 10, line 5, and replace it with the following replacement paragraph:

Fig. 2 illustrates an optical instrument, a microscope system 1, to which the autofocus system according to the present invention may be applied. The hardware components of the system 1 include a microscope [[1]] 10, a motorized stage 2 controlled by a pair of XY motors 3 and a Z motor 5, an XYZ stage controller 6, a video camera 7, an image processor and host processor 9 with a video frame grabber 8. A separate image processor including video frame grabber may be provided by the present invention is not limited thereto. The XYZ stage controller controls the movements in the X, Y, and Z directions independently. The Z direction is along the optical axis (the focusing axis) of microscope 10. Typically, the microscope stage 2 will be moved laterally and vertically under computer control by stepper motors or DC servomotors. Suitable components are further described in detail below in the description of the examples. The specimen 4 to be viewed through the microscope 10 is located on the stage 2. Lamps, e.g. fluorescent lamps, and other optical accessories well

known to the skilled person will not be described.

Please delete the paragraph beginning on page 11, line 30, and replace it with the following replacement paragraph:

Examples of the types of functions useful in embodiments of the gradient filter in accordance with the present invention are shown in Figs. 3A to E. Fig 3A shows a function with its X axis as the spatial axis in pixel units and its Y axis being the weighting factor used in the digital filtering. The spatial origin preferably coincides with the pixel to be filtered (as shown). The function is the spatial derivative of a normal Gaussian curve. It can be seen that the function has two lobes, one positive and one negative either side of the spatial zero. These lobes extend over a spatial distance of at least 3 pixels either side of the spatial origin. In fact, in the example shown, the function has appreciable values up to 7 pixels each side of the origin. The effect of the difference in sign of the lobes each side of the spatial origin is to determine a gradient of the image when the function is used for digital filtering. Within the extent of the function which has appreciable values there is only one zero crossing. This is preferably at the spatial origin as shown in Fig. [[2A]] 3A , i.e. the zero crossing coincides with the pixel to be filtered.